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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,809	08/03/2001	Michael L. Perry	C-2462	8358

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07/20/2004

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210 Main Street
Manchester, CT 06040

EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 07/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/921,809

Applicant(s)

PERRY ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-11 is/are allowed.
- 6) ☒ Claim(s) 2-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 2-11. Claims 7-11 are allowed. Claims 2-6 remain rejected for the reasons of record. Accordingly, this action is made final.

Claim Rejections - 35 USC § 103

2. Claims 2, 3, 5, and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy (U.S. Patent 6,251,534).

Regarding claim 3, the reference is directed to a fuel cell cascade flow system (see abstract). As shown in Figure 1, the system contains a first group of cells (200) and a second group of cells (300). The system comprises fuel inlet and outlet means (valves) which are settable in two conditions (see Fig. 1; col. 6, lines 8-50). The first condition is a normal "series" flow where the fuel must flow through each stack and the second condition is a "parallel" ("purge") flow where the fuel flows through each stack individually without passing through any other stacks. Regarding claim 3, the conditions are set by a controller (530), and the fuel is supplied from a source (405). Regarding claim 6, the system comprises fuel inlet manifolds (202, 302) and fuel exhaust manifolds (204, 304), the fuel inlet means (500) being disposed between the fuel source and the inlet manifold, and the fuel outlet means (510, 520) being disposed between the exhaust manifold and the system exhaust. Regarding claim 5, the fuel

outlet means includes a valve (510) between the exhaust and the last group and a valve (520) between the exhaust and the first and second groups. Regarding claims 2 and 3, the reference teaches in column 7, lines 18-30 that the invention is not limited to systems having only two cascaded groups (stacks) and that a plurality of stacks may be used.

However, the reference does not expressly teach that there are at least three groups (stacks) and that the number of fuel cells in each group exceeds the number of fuel cells in any group downstream thereof, as recited in claim 3.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use a cascade of at least three stacks, wherein the number of fuel cells in each group exceeds the number of fuel cells in any group downstream thereof. As noted above, the reference teaches that the invention is not limited to systems having only two cascaded groups. An artisan would be motivated to use three or more groups in order to increase the power output of the fuel cell. Similarly, the reference teaches that the number of fuel cells in each stack may be adjusted according to the desired power output of the system (col. 6, line 66 et seq.). As an example, the reference teaches progressively increasing stack sizes for low-power operation. Therefore, for high-power operation, the artisan would be motivated to use the opposite configuration, i.e., progressively decreasing stack sizes in the cascade. As such, for high-power operation, the claimed configuration of three stacks which progressively decrease in size would be obvious to a skilled artisan. Further, the artisan would be sufficiently skilled to modify the valve system of McElroy so as to render it suitable for a three-stack system.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy in view of Chen et al (U.S. Patent 5,985,474).

McElroy is applied for the reasons stated above. In addition, the reference teaches that the fuel inlet means comprises a blower (420) between the source (405) and the first stack (200) and a valve (500) between the source and the second (and third) stacks (see col. 6, line 21).

However, McElroy does not expressly teach that a *valve*, rather than a blower, is disposed between the source and the first stack, as recited in claim 4.

The patent of Chen et al. is directed to a fuel cell system. In column 8, line 23, the reference teaches that “[i]n addition, it will be appreciated that instead of valves, variable speed pumps and/or blowers may also be suitable for regulation of system 100, e.g., for controlling the flow of air, fuel and reformat.”

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Chen et al. indicates that valves are functionally equivalent to blowers for controlling the movement of gases through a fuel cell system. Therefore, the artisan would be sufficiently skilled to replace the blower of McElroy with a valve. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

Response to Arguments

4. Applicant's arguments filed May 13, 2004 have been fully considered but they are not persuasive. Applicants state that "McElroy has only two groups; the layout in McElroy is not seen to lend itself to three groups and certainly does not suggest three groups in any fashion whatsoever." In response, at column 7, line 18, the reference teaches that "the invention is not limited to systems in which only two fuel cell stacks form a fuel cell cascade [...] Rather, the system can include a plurality of fuel cell stacks." Thus, the reference clearly suggests to one of ordinary skill in the art that three cell groups may be used.

Applicants then assert that the principle of operation of the reference would be changed if a third group were to be added. This is not believed to be the case. The principle of operation of the reference is merely the switching between parallel and cascade flow through the cell stacks (see abstract of McElroy). The addition of a third cell group is not seen to change this principle.

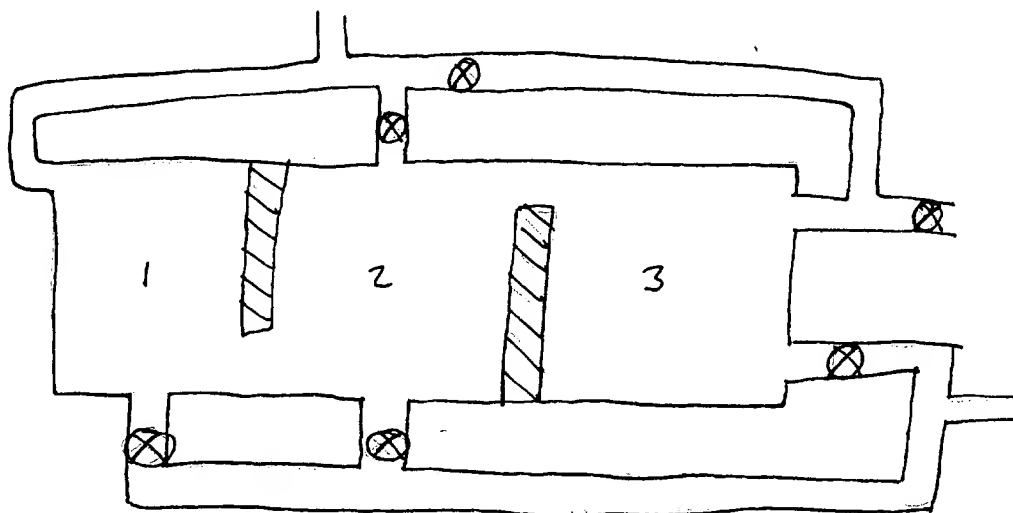
Applicants further assert McElroy teaches away from the claimed invention because it teaches progressively increasing stack sizes (column 7, line 5), whereas instant claim 3 calls for progressively decreasing stack sizes. However, the teaching of McElroy does not constitute a teaching away from the claimed invention because McElroy's teaching is merely an example of the system broadly disclosed in the reference. See column 7, line 2 of McElroy. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971); MPEP §2123. Applicants further state that the prior art must be considered in its entirety, including disclosures that teach away from the claims. In response, it is asserted that the

reference has been considered in its entirety, with the conclusion that Applicant's configuration would still be obvious in light of all of the teachings of the reference. As noted above, in one example, the progressively increasing stack size is disclosed as useful in low-power operation of the system (col. 7, line 2). As such, a person of skill in the art viewing this disclosure would reasonably be able to conclude that the opposite would be true, i.e., that progressively decreasing stack size would be useful in high-power operation of the system.

Regarding the Examiner's assertion that a skilled artisan could modify the valve structure of McElroy to accommodate three stacks, Applicants assert that "the Office is here challenged to show that it could be done: that is, if a third stack could also be brought into series or parallel with the other two, without altering how the stack 300 and the stack 200 receive and exit fuel depending on whether they are in series or parallel, then that should be shown, should be proven." The applicant's request for "evidence" of how the modifications can be achieved is noted and is addressed hereinbelow. However, the addendum to the request--that this must be shown without altering how the existing stacks of McElroy receive and exit fuel--is not believed to be justified or supported by the statute. Applicants state that "altering the configuration that is already there" is "impermissible in a prima facie obviousness rejection." However, by their very nature, obviousness rejections involve a modification of the prior art. Thus, Applicant's criteria that the existing configuration of McElroy cannot be modified is not seen as valid. As stated above, the principle of operation of McElroy is the switching between cascade and parallel flow. Adding a third stack to the configuration would not change the principle of operation of the reference. Furthermore, the addition of appropriate valves and conduits to accommodate the

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third stack is a routine engineering problem that can be easily solved by a person of ordinary skill in the art. As an example, the following system was designed by the Examiner by adding onto the two-stack system of McElroy and adding valves and conduits (no valves or conduits were removed):



This drawing is merely an example of how such a system might look and is not intended to be limiting.

Regarding the limitation that the system is “electricity producing” in one state and “purging” in another, Applicants assert that both of the configurations of McElroy are electricity-producing operations. However, this does not preclude the fact that the system of McElroy would inherently purge the system of unused reactants in the “parallel” operation of the system. It is submitted that the system of McElroy produces electrical power in the parallel flow state *while* the cells are purged. Thus, purging and electricity production are not mutually exclusive

states. As such, while the system of McElroy produces power in both parallel and cascade flow, the cells would also be purged during parallel flow. As such, the language of claim 3 is still met by the reference.

Allowable Subject Matter

5. Claims 7-11 are allowed.
6. The following is a statement of reasons for the indication of allowable subject matter:

The reasons for allowance of claim 7 were given in the previous Office action and remain applicable herein.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jonathan Crepeau
Patent Examiner
Art Unit 1746
July 16, 2004